Science News-Letter

The Weekly Summary of Current Science

A Science Service Publication

Edited by Watson Davis
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GENERAL SCIENCE

Free Geniuses, Says Hoover

"The day of genius in the garret has passed, if it ever existed," declared Secretary Herbert Hoover in addressing the honorary scientific society Sigma Xi at the Philadelphia meeting of the American Association for the Advancement of Science during Christmas week. Nowadays as he pointed out, "discovery must be builded upon a vast background of scientific knowledge, of liberal equipment. It is stifled where there is lack of staff to do the routine and valuable time must be devoted to tending the baby or peeling potatoes or teaching your and my boys. The greatest discoveries of the future will be the product of organized research free from the calamity of such distraction. Yet the whole sum we have available to support pure science research is less than ten million a year with probably less than four thousand men engaged in it." But in the application of science to industry we are spending probably two hundred million with perhaps thirty thousand men engaged. Yet fundamental research in pure science is the basis of its applications.

"Faraday in the pursuit of fundamental law discovered that energy could be transformed into electricity through induction. It remained for Edison, Thompson, Balle, Siemens and many score of others to bring forth the great line of inventions which applied this discovery from dynamo to electric light, the electric railway, the telegraph, telephone and a thousand other uses which have brought such blessings to all humanity. It was Hertz who made the fundamental discovery that electric waves may traverse the ether. It was Marconi and DeForest who transformed this discovery into the radio industry. It was Becquerel who discovered the radio activity of certain substances and Professor and Madame Curie who discovered and isolated radium. It was Dr. Kelly who applied these discoveries to the healing art and to industrial service. It was Perkins who discovered the colors in coal tar by-products. It was German industrial chemists who made the inventions which developed our modern dye industry. It was Pasteur who discovered that by use of aniline dyes he could secure differentiation in colors of different cells, and this led to the discovery of bacilli and germs, and it was Koch and Ehrlich who developed from this fundamental discovery the treatment of disease by antitoxins."

PHYSICS

Radio Death-Force

A new investigation of a radio death-force has been made by Prof. R. W. Wood of the Johns Hopkins University and A. L. Loomis of Tuxedo, N. Y., who recently startled the scientific world by the so-called "death whisper" consisting of rays of inaudible sound waves. Their new results have been obtained in a quite different field. They arranged two metal plates a couple of inches apart, and connected them with an electrical oscillator like the ones used in radio sending sets but much smaller. This drives into the plates an intense electric current, alternating at the rate of approximately one hundred million times a second, and giving rise to extremely short radio waves, about three meters long. A mouse placed between the plates, though not touching either one of them, was killed by the intense electromagnetic field. It died in about half a minute, and its blood was found to be all coagulated in its veins. A test tube containing several insects was next tried. The insects were likewise quickly killed, and their bodies became dry and brittle. Professor Wood stated that the experiments were begun only a few days ago, and that the near future is likely to bring some startling results, but he pointed out emphatically that a devastating death-ray to kill at great distances is not to be looked for from this apparatus.

MATHEMATICS

Beyond Einstein

Mathematics lies at the basis of all the other sciences and a science is regarded as becoming most scientific when it can be treated by mathematical methods. Astronomy and physics reached the mathematical stage first, chemistry is rapidly following suit and recently biology and psychology are making use of mathematics. On account of the fundamental importance of mathematics any advances in this field are welcomed by investigators in every field of research.

Consequently it is not surprising that the thousand dollar prize offered for a notable contribution to the Christmas sessions of the American Association for the Advancement of Science at Philadelphia, is awarded this year to Prof. G. D. Birkhoff of Harvard for his mathematical paper entitled "A Mathematical Critique of Some Physical Theories." Although the committee contained no representative of the Mathematical Section it picked his paper from the two thousand that were read during the week.

Only professional mathematicians will understand its significance and it is impossible to present its formulas in ordinary type. So all that can be done here is to show what the paper is about and why it is considered important by experts.

Geometry was developed into a perfect logical system by the Greeks and until the nineteenth centruy was taught exclusively as the last work in this science. But recently it has been found possible to develop other systems of geometry, equally consistent within themselves. This raised the question whether the Euclidean geometry or some of its newer rivals, the non-Euclidean geometries, best fitted the world as it is. When Einstein pointed out that the non-Euclidean geometry gave a better explanation of other physical phenomena, mathematicians plunged into the new field with greater zest.

Professor Birkhoff has taken a step

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Beyond Einstein

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beyond Einstein. He accepts the four dimensional view of space and time embodied in the theory or relativity as "reasonably correct qualitatively" but points out that no way has yet been found to account for all the lines of the spectrum of light, which are ascribed to the frequency of vibration of various parts of the atom. The atom was formerly regarded as simple, but is nowadays regarded as composed of positive and negative electrical particles, called protons and electrons, the unlike bodies attracting and the like bodies repelling each other.

But Professor Birkhoff proposes the use of a new type of elastic body and the "new assumption that the electrical forces between the charges on one and the same proton or electron are attractive instead of repulsive." The laws of space and time in the atomic domain seem irreconcilable with the known statistical laws that can be directly verified but he hoped that "the mathematicians would develop various types of mathematical universes which might subsequently be of aid to the physicist."

For the second time in its four years of existence, the thousand-dollar annual award given at the winter meeting of the American Association for the Advancement of Science has gone to a mathematician.

Dr. Birkhoff was born in Michigan in 1884. He first entered college at the Lewis Institute in Chicago, but received his bachelor's degree at Harvard, in 1905, followed by an M. A. in 1906. He returned West, however, for his doctorate, receiving it at the University of Chicago in 1907. He taught at the University of Wisconsin and at Princeton, until Harvard called him back in 1912; since 1919 he has held full professorial rank there.

He has written much on mathematics, especially on relativity, and has been editor of two mathematical journals. He is president of the American Mathematical Society, and has received recognition abroad by the Circolo Matematico di Palermo, the Royal Danish Academy of Science and Letters, the Göttingen Academy of Sciences and the Royal Institute of Science, Letters and Arts of Venice.

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A device for weaving without a shuttle has been exhibited in Germany.

Sirius, the dog star, gives off about 48 times as much light as our sun.

STUDY HELPS FOR SCIENCE CLASSES

These articles will be found to be especially useful in class work

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(This will fit on a 3 x 5 card.)

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News-Letter Features

Born over four years ago of the demand and interest of those individuals who had caught a glimpse of *Science Service's* news reports to newspapers, the SCIENCE NEWS-LETTER has since proved interesting to laymen, scientists, students, teachers and children.

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The classics of science and striking passages from current books, addresses and periodicals are carefully selected and published.

Important *anniversaries* of science are appropriately noted week by week in a special department.

Regular articles tell of the happenings in the *skies* and in the great *outdoors*.

Photographs aid in the telling of the week's science.

Great care is taken to keep its editorial content not only *interesting* but *accurate* as to fact and implication.

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Ancient Indian Civilization Found in New Mexico

THE EARLY PUEBLO LEARNED how to pile up rock into standing walls and built such community dwellings as this on the top of Puye mesa.

On the eastern shore of America the Plymouth Rock stands witness to the arrival of the English settlers come to make their home in the new world. Along the California coast runs the chain of mission churches erected by the colonizing Spanish priests. To the average American these are the oldest tangible relics of the early history of his country.

The Pueblo Indian who sells pinyons and pottery to curious tourists along New Mexico and Arizona highways takes small stock of such newcomers as the Pilgrim Fathers and the Franciscan Missionaries. "My people," he says with pride, "have been living in this country for more than four thousand years. See. There are the houses my ancestors built. The walls are still standing. We came up from under the earth to this spot which is the center of the world."

The Indian has it from the priests of his clan about his origin. The legend has been handed down to him by word of mouth for centuries and he believes it. Students of ethnology are able to tell him nothing more certain about where his ancients came from but his boast of long residence in the southwestern corner of the United States is a proven fact. Archæologists who have excavated the ruins of pre-historic villages have assured the Pueblo of the present day that the people from whom he descended were living on these sites at least two thousand years before the coming of Christ, perhaps thousands of years previous to that date.

From the ruins which are found scattered extensively over nearly the entire area of the four southwestern states it is evident that a primitive race at one time occupied the high plateaus with an enormous population. From the similarity of the bones, pottery and implements unearthed in the graves and ruins of houses it is found that the Pueblo culture spread to all parts of this great area in the same general periods. The direct descendants of the aborigines, numbering now not more than eleven thousand, are living today in a score or so mud villages strung through northern New Mexico and Arizona.

The historic period in the lives of the Pueblos began with the coming of the Spaniards up from Mexico in 1540. The chroniclers of the various expeditions reported the Indian tribes living in great communal villages struggling to protect their food supplies from their nomadic enemies and with none of the gold which the Spaniards sought. The invaders learned little of the earlier history of the natives they found for they had no written language with which to record events. Nor have students today anything to work upon but the legendary tales which have come down the succeeding generations and the remains of the early cultures to be found in buried cities.

It is possible that there may have been older civilizations in America than that of the Indians of the Southwest but nowhere in the country are to be found relics which seem to date back so far. The dry climate of the high plateaus the aborigines occupied is most favorable for the preservation of their remains. Excavations of the prehistoric village sites reveal whole skeletons surrounded by articles of food, pottery and ceremonial objects which had been placed in the grave at the time of burial. From these objects the student can estimate the age, stature, habits, occupation and culture of the earlier peoples.

The pottery found in the excavations at the pueblo of Pecos, New Mexico, has proved that site to be a valuable stratigraphical key to the culture development of the Pueblos through a long period of prehistoric times. The village, of which only a few walls are still standing, covers a low tableland that has been occupied in the various quarters for hundreds of years, successive layers of houses having been built upon the ruins of older ones. In the rubbish heaps which border the mesa have been found pottery representing all stages in the development of ceramics from

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TWO KIVAS, or underground ceremonial chambers of the prehistoric cave dwellers at the Mesa Verde ruins partially restored by archæologists.

Ancient Indian Civilization

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the earliest corrugated ware to the high glazes and intricate design of the historic period. These fragments were found in clearly definable strata, the earliest types in the lowest depths of excavation and the later types at higher levels in the mounds of debris.

The first Southwesterners of whom no traces have been found as yet, are thought to have been nomadic people who wandered in bands over the country living on such small game as they could kill with their primitive weapons and upon the wild plants and berries they found. They apparently did not know how to farm or to manufacture pottery for their domestic uses.

As long ago as 2000 B.C. farming was begun in the Southwest, according to the beliefs of Dr. Alfred V. Kidder, eminent archæologist of the Phillips Andover Academy. The Basket Makers, as he calls the first agriculturists, learned to cultivate a heavy seeded grass that resembled corn. Discovering that this crop could be harvested and stored as a reserve food supply, the former nomads gave up wandering to some extent and settled down near their fields. It is doubtful if they built permanent homes, for their first concern in the way of shelter was a safe storage place for their grain.

The Basket Makers built temporary shelters for themselves somewhere near their food supply which they usually hid in holes in the floors of caves. With their increased leisure from hunting they were able to devote more time to their domestic handicrafts, perfecting crude stone and wood implements and weaving baskets and sandals of dried grasses. They apparently raised no beans or cotton and were ignorant of pottery making.

As the people depended more and more upon their cultivated food they became more sedentary in habit. From the protective walls of slabs which they built about their storage cists for grain, they conceived the idea of enlarging them into homes for themselves. They raised higher walls of stone around the pits and provided them with roofs of poles and brush. These crude, half underground shelters from the weather marked the beginning of domestic architecture in America. Then began the making of pottery. Whether the Indians discovered for themselves that clay dried in the sun upon their baskets resulted in a more useful receptacle, or whether they were taught the craft by more advanced tribes from Mexico is unknown.

A still more extensive spreading of a later culture covered almost the whole of Utah into southern Nevada, the southwestern corner of Colorado, practically all upper New Mexico and the northeastern corner of Arizona. In this great area are found ruins of horizontally coursed masonry or adobe with the closely grouped rectangular rooms in which are found corrugated and black-on-white pottery. It is believed by Dr. Kidder that this early Peublo culture was diffused from the San Juan basin, where it reached its highest development, and spread rapidly among other tribes which had not previously been agricultural.

The evolution of houses from the first pit dwellings into units of rectangular rooms grouped together with the round chambers segregated for ceremonial purposes, and the banding together into villages were important developments of the Pueblo period. The first villages were small and located in sites not easily defended from enemies. In time there was a gradual abandonment of the unprotected settlements on the outposts of the great area. The increasing inroads of the nomadic tribes in search of easily gained food resulted in a concentration of the farming people into larger settlements toward the center of the area and the building of the great communal houses in cliffs, caves and canyon heads.

Today the Pueblo Indian lives in the same type of adobe communal dwelling which his ancestors developed out of their necessity. He pursues the same peaceful occupation in the corn fields, worships his gods with the same ceremonies, and with the exception of tin pans and sewing machines, orders his domestic routine in much the same way as did his primitive forebears. The European occupation of the Southwest has merely continued the crowding-in process begun by his nomadic enemies milleniums ago.

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Fleas have very poor eyesight.

About one person in 3,000 in India has leprosy.

A new European automobile has a transparent top.

American women patent over 500 inventions a year.

The egg of California condor is valued at about $1,500.

Oil of catnip is used as bait in catching bobcats and lynxes.

Wooden helmets for miners are being manufactured in England.

Some Indians of the North have believed for centuries that a bear will come out of its lair to be killed if plead with courteously.

Only about one-half per cent. of the coal reserves of Missouri have been exhausted, leaving some 78 billion tons to be mined.

A wind tunnel to be installed at New York University is said to represent the most up-to-date equipment for testing airplane models.

Depth finding apparatus has been used to trace more exatly the boundaries of the continent which sank in the Atlantic millions of years ago.

A long continued spell of dry weather in Victoria allowed films of dust to collect on power lines, and "flash-overs" or short circuits resulted.

A photograph taken at Panama from an altitude of 12,000 feet shows both the Atlantic and Pacific Oceans, and the entire width of the Canal Zone between.

ARCHÆOLOGY

Beginnings of Maya Culture

By E. N. FALLAIZE

Secretary, Royal Anthropological Institute

Recent excavations at Lubaantun in British Honduras have furnished results which make it seem likely that further work on this site may throw light on the obscure question of the origin of the early culture of Central America. As is well known, the culture of Central America when discovered by the Spaniards had reached a comparatively high level. Archæological research has further revealed the fact that the races of Central America, and especially the Maya of Yucatan and Honduras, produced work of high artistic excellence, especially in architecture, stone carving, and fresco painting. But even the so called "Early Maya" culture of Copan and Quirigua has a long history of artistic development behind it. Yet no archæological investigation has succeeded in bringing to light any evidence to show what were the earliest beginnings of this highly developed culture, and the lines upon which it travelled to arrive at the pitch of excellence at which we know it. This is the problem which it is now hoped to solve at Lubaantun.

The recent excavations which make this appear possible were carried out by Capt. T. Athol Joyce of the British Museum, England, in company with Lady Richmond Brown and F. A. Mitchell Hedges, to whom the concession to make excavations was first granted by the Government of British Honduras.

The site of Lubaantun lies on a spur between two converging river valleys which lead down to the Columbia river. The top of the spur was levelled and a number of buildings erected upon it, principally pyramids and mounds intended for religious purposes. The sides of the hill were hollowed out into a series of terraces which were faced with blocks of stone. The earlier terraces were subsequently covered over or refaced by additions of later date. In several respects the remains on the site are unique in Maya archæology, and the site itself is the largest Maya site known, being over 600 feet in length and 500 feet broad.

Four different styles of architecture can be distinguished in the building of the terraces and with one exception their chronological relation can be determined. The

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GENERAL SCIENCE

Pres. Noyes on the A.A.A.S.

In response to a request by Science Servcie, Dr. A. A. Noyes, newly elected president of the American Association for the Advancement of Science, has made the following statement.

It seems to me that there are three main directions in which the American Association is making large practical contributions to the "Advancement of Science"—the purpose expressed in its title:

It is popularizing science, by creating better appreciation among the intelligent public of the spirit and methods of science and of the tremendous intellectual and practical importance of extending by research the bounds of knowledge.

It is acting as an agency for the federation and broadening of scientific work, by bringing together, especially at its annual meetings, the various scientfic societies and leading scientific men in different fields.

It is directly promoting research, by the formulation and promotion of large projects of investigation, by assistance to and recognition of individual investigators.

The last of these functions the Association shares with other scientific organizations. In connection with the first two of these functions it has, however, a somewhat unique opportunity; and to fuller realization of this its efforts in the next few years should, I think be primarily devoted.

Dr. A. A. Noyes is director of the Gates Chemical Laboratory at the California Institute of Technology, Pasadena, a position which he has held since 1920. Previous to that time he had for seven years been in charge of research in chemistry at the same institution. His earlier career had centered at the Massachusetts Institute of Technology, his first alma mater, and had included a period of two years as its acting president.

Dr. Noyes was born at Newburyport, Mass., in 1866. His education began at the Massachusetts Institute of Technology, where he received his bachelor's degree in 1886 and his master's degree one year later. He went to Germany for his Ph.D., which he received at Leipzig in 1890. He holds honorary degrees from the University of Maine, Clark University, the University of Pittsburgh, Harvard University and Yale University.

A sturdy adjustable platform that can be fitted outside of a window sill makes washing windows a safer job.

PSYCHOLOGY

Does Sex Sway Thinking?

When you hear the word "party" what do you think of first? This is one of a series of test words used in a series of experiments being carried on by Dr. Lewis Terman of Stanford University to determine the degree of masculinity and feminity in the make-up of the personality. To the word "party" the boys were most apt to respond "eat" and the girls "dress." When the word "squeeze" was spoken most of the boys thought first of "lemon" and the girls "love." But for the most part the tests so far given show that traditional ideas on what each sex is interested in and finds attractive are far from accurate. It was hardly expected that girls would excell boys in remembering the number of bones in the body, or that boys would outdo the girls in knowing about the Mona Lisa, but such is the case, Dr. Terman found.

"Very little is known as to the differences between the sexes in abilities and talents and character," he stated. "Literature on feminism sheds more light on sex prejudices than on sex differences. This investigation aims to find out where the differences really lie, and how they may be characterized."

Definite information may settle the old question of whether the extremely masculine type and the clinging vine feminine type really make the best matrimonial combination, Dr. Terman suggested.

PSYCHOLOGY—PHYSICS

"Blues" Collected by Camera

The white magic by which the modern scientist can make sound waves appear before him and reveal their secrets is described by Dr. Carl E. Seashore, of the University of Iowa. He said that photographic records of the sound waves that make up a song are far more faithful in detail than the message that the song carries even to the most musical ear. Dr. Seashore has a visible record of a negro "blues" song as sung in a cornfield and also an Indian song.

Showing how these marks in black and white reveal much more definite information as to the pitch, vibrato, and other qualities of the singer's voice than phonograph records can record, he declares that no collector of primitive music can now afford to collect with the phonograph alone.

The National Museum has been given a collection of 20,000 water beetles.

Emery was used for grinding and polishing in the time of the Pharache.

The Gobi Desert of Mongolia abounded in life in earlier geologic times.

Only three cases of yellow fever were reported on this side of the globe last year.

A suspension bridge 250 yards long in China is built entirely of bamboo cables.

There are no public libraries in 1,160 countries in the United States and Canada.

The American bison has a hump on its shoulders, whereas true buffalos have no hump.

Salt content of the Colorado River is much higher than it was 25 years ago, because of areas now under irrigation.

That typhoid fever is still a strong menace to life is shown by the fact that there were 9,000 more cases in 1925 than in 1924.

Beginnings of Maya Culture

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earliest consisted of perpendicular buildings with excellently cut and well matched blocks with a regular setback at every few courses. The second is peculiar to Lubaantun, and represents a new phase in American architecture. It is an "in and out" method of building in which each of the second of two courses projects beyond the one below it. The third type consisted of obviously late additions composed of badly cut and ill matched blocks.

In the fourth style, of which the chronological position has yet to be determined, the buildings are composed of huge blocks of stone, so large as almost to justify the term megalithic. They are over five feet long, two feet high and four feet deep. Masonry of this kind has not been discovered hitherto in Central America though it is known in Peru. The position of these megalithic terraces suggests that they are older than two of the "in and out" pyramids, themselves of very high antiquity.

It is noteworthy that throughout the whole district of Lubaantun there is an entire absence of ornamental carving in stone. The pottery and fragments of plaques and figurines, each with a whistle behind, resemble in style the stone carving of such early Maya sites as Copan and Quirigua. But as the pottery from Lubaantun is derived from surface finds, that which will be found in the lower submerged layers may be expected to reveal sensational finds of a culture even earlier than the earliest Maya culture now known.

It would seem that this British Honduras site has revealed a branch of Maya culture with entirely new characteristics. Many of the structures are obviously of very great age, and the extent of these remains shows that not only must a considerable antiquity be allowed for its inception but the quarrying and cutting of the thousands of stones built in the numerous terraces must have been the work of a highly organized population of considerable size whose labors extended over a long period of years.

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A method of measuring the strength of a dose of X-rays has been developed and is expected to eliminate danger of burns from X-ray treatment.

GEOLOGY

Earth Never Molten

The earth did not start as a sphere of superheated gases, slowly cooling down to a globe of liquid lava and finally to its present solid state, according to Prof. T. C. Chamberlin of the University of Chicago. Prof. Chamberlin has for a number of years advocated a theory for which he and his colleague Prof. F. R. Moulton are responsible, that the earth and all the planets originated by the lumping up of vast masses of small cold cosmic particles, after the fashion of a big snowball, and that lava and other phenomena of earth-heat are of relatively late origin and not from great depths in the earth.

A number of objections are advanced by Prof. Chamberlin to the old hot-origin theory. The smaller planets, including the earth, he says would never have had an atmosphere if they had developed by condensation of heated gases; but if we adopt his "planetesimal" hypothesis of a cold-particle origin the atmosphere can be accounted for as having arisen by the chemical action of the rocks. Furthermore, he claims, if the earth had to spin for many ages as a ball of molten rock it would have bulged out at the equator much more than it does, and would have had much more of an onion-like shape. While it is true that the earth is somewhat flattened at the poles, this flattening is not sufficient to fit in with a molten, spinning origin; and we are confronted with the further curious fact that whereas the North Pole is situated in a depression surrounded by a series of mountain chains, the South Pole is on a high plateau surrounded by a series of troughs in the bottom of the ocean.

The distribution of the stuff the earth is made of is not even, as it should be if it had ever been all one molten mass. Instead, there is a concentration of the heavier materials towards the southern latitudes, where the widest ocean stretches are, while the lighter ones have been rumpled up into the mountain masses on the great continents concentrated at the northern end of the map.

The moon as well as the earth gives testimony in favor of the planetesimal hypothesis. The vast craters that pockmark its face are of the kind that would be formed by volcanic eruptions taking place under great loads of loose, dry materials. What the moon looks like now the earth once looked like; but the moon, having no atmosphere, could have no

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SOCIOLOGY

No Birth Control for Masses

Why should we protest about the big families of laborers of today when from their ranks are recruited the professional people of tomorrow?

In analyzing data collected on the number of children born to men aged 45 years and older, Dr. Raymond Pearl, director of the Institute for Biological Research at the Johns Hopkins University has found that the professional, clerical, trade, domestic and personal service, public service, and transportation occupational classes do not quite produce enough offspring to maintain their present numbers. On the other hand the heavy laboring classes of the manufacturing, agriculture and mining occupations are reproducing themselves in excess of their present representation in the population. It is from this excess, Dr. Pearl suggests, that the deficiencies of the first six classes must be made up, if the present proportion of the occupations in the total population is to be maintained.

Such an order of things is not undesirable in the opinion of the distinguished biologist for, he asserts, "We need to have laborers reproduce faster than do professional men, in order, first, to take up the greater human wastage in the laboring classes, and second, to permit of continued industrial growth and prosperity. Probably a sound economic structure of the country as a whole is in a very real and considerable sense dependent upon just this relationship. So far from being alarmed at the present situation, we should find serious cause for real alarm if it were markedly different from what it is.

"To be sure, some part of the next generation's supply of professors, doctors, lawyers, bankers, railroad presidents, and the like, will have to be recruited among the sons of the farmers and factory laborers of this generation. But what of it? Just precisely this relationship has always been true so far in the history of the world and probably will be true for a long time to come. And furthermore from just the same sources will have to be recruited some of the clerks, typists, small tradesmen, jobholders, brakemen, motormen, and various other less lofty citizens.

"The superior people of the world have always been recruited from the masses in far greater proportion than they have been reproduced by the classes. This does not at all necessarily imply that environmental influ-

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BOTANY

Bose's Claims Denied

The heartbeats of plants which Sir Jagadis Chunder Bose claims he has demonstrated are mere figments of a romantic Oriental imagination, unsupported by any genuine scientific fact, according to Dr. D. T. MacDougal of the Carnegie Institution of Washington. Dr. MacDougal recently discussed the problems of the uphill flow of water in trees, and took occasion to criticize the statements of the Indian savant in the sharpest terms.

"An examination of the assertions of Sir J. C. Bose that sap is pumped upward by pulsating action of living cortical cells has been made," he stated. "Bose's claims as to the rate and mechanism of sap movements ignore well-established anatomical and mechanical facts, and are based upon imagined but impossible hydrostatic action of living cells. No single direct observation nor any measure of pulsatory action has even been made, by Bose or anyone else, yet an explanation of the ascent of sap is based on such an idea."

After characterizing Bose's claim of a rate of pumping which would take a drop of water through the plant's tissues at the rate of from two to four hundred living cells a second as "too fantastic for serious comment," Dr. MacDougal continued:

"When Bose's suggestion that these pulsations may be the result of stimulation by friction of the roots with soil particles is carefully examined, it is realized that the passage from pseudo-research to infantile fancies is an easy one. A sympathetic exposition of the Bose Institution and of the work of its director includes the following passage: 'For the mysteries of Nature are probed in Sir Jagadis' institute not by study of libraries or by mechanical experiments, but primarily by communion with the unseen and the un-known. Inspiration, imagination, intuition, vision, this is an even more romantic touch.'

"The correctness of this characterization is attested by every page of Bose's book on the ascent of sap, which is utterly lacking in scientific significance. Such books appearing on the lists of scientific publications constitute a menace and danger to sound science.

"Since the acceptance of Bose's work in America has been widely proclaimed in the popular press of Great Britain, we are led to say that such recognition of Bose's work on

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Bose's Claims Denied

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ascent of sap and the nervous mechanism of plants has been confined to palace tutors. Cabinet ministers, political propagandists, and literary reviewers whose capacity for judgment, motives and purposes may not be adequately discussed here."

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The mink, popular for its fur, belongs to the weasel family.

Stars are red, yellow, white, or blue, according to their temperature.

The United States buys 95 per cent. of all silk Japan exports.

A resort hotel in California is insured against damage by tidal wave.

Ice from Artic regions was recently found drifting 250 miles southeast of Bermuda.

When the temperature is at 100 degrees, ants move twelve times as fast as at 50 degrees.

New York uses nearly one-eighth of the total electricity generated in the United States.

No Birth Control

(*Continued from page* 23)

ences have been the chief factor in the production of superiority. On the contrary, Galton's work shows that heredity plays the principal role. But the almost infinite manifoldness of germ-plasmic combinations can probably be relied on to produce in the future, as it has in the past, Shakespeares, Lincolns, and Pasteurs, from socially and economically humble origins."

Science News-Letter, January 8, 1927

When angry a skunk stamps on the ground with its fore feet.

Some railroads are forced to wage war on pocket gophers to protect their railway embankments.

The loss in iron escaping from the blast furnace amounts to three per cent. of the iron mined.

Artificial straw, artificial "horse hair," and artificial wool are recent developments of viscose.

History is our most important science, according to Dr. Michael Pupin, famous electrical engineer.

Earth Never Molten

(*Continued from page* 23)

weather and hence no weathering of its mountains, whereas the earth's features have been worn down by winds and rains and forests for untold ages, while entirely new mountain ranges have arisen a dozen times over through the restless heaving of its crust.

Science News-Letter, January 8, 1927

Caries, a disease of the teeth, is found in the remains of fishes that lives 20,000,000 years ago.

Bamboo is so important in China that its disappearance would leave the country in a state of chaos.

Students entering Pennsylvania State College are now photographed for future reference.

Use of motion pictures in medical classes makes it possible for students to study more carefully the technique of surgical experts.

When it rains and the temperature is below freezing, the raindrops solidify on striking a solid object, and the result is an ice storm.

Summary of Scientific Events During 1926

The first instalment of this summary of science for the past year appeared in the SCIENCE NEWS-LETTER of January 1, XI, 4, and covered æronautics, anthropology and psychology, astronomy, biology, and chemistry.

Chemistry (Continued)

A set of world standards for gasoline and other liquid fuels was proposed at the meeting of the International Union of Pure and Applied Chemistry.

Prof. Richard Zsigmondy of the University of Goettingen, Germany, received the 1925 Nobel prize for chemistry, and Prof. The Svedberg of the University of Upsala, Sweden, was awarded the 1926 Nobel chemistry prize.

Poland elected as its President, Prof. Ignatz Moscicki, well-known scientist in the field of chemical engineering.

The American Chemical Society celebrated the fiftieth anniversary of its foundation.

A meeting of the International Union of Pure and Applied Chemistry was held at Washington, September 13-15.

Engineering and Invention

High steam pressure boilers promised to revolutionize future locomotives.

Cellulose skins for sausages were perfected at the Mellon Institute.

Refrigerators cooled by gas flame and by steam were invented by European engineers.

A machine for automatically coding cipher telegraphic messages was perfected.

Prof. Schwartz of the University of Stellenbosch proposed a scheme for checking the gradual drying-up of South Africa by damming the Kuene River.

Secrets of the long-range German cannon that bombarded Paris from a distance of over 60 miles, were revealed following the death of the inventor, Dr. Fritz Rausenberger of the Krupp firm.

Steel sections, formerly used only in skyscrapers, were used in residences and buildings of light construction class.

Practically all of the important railroad lines in the United States decided to establish auxiliary motor lines, as a result of a meeting of railroad officials representing 51 lines.

Exploration

Lieut. Commander R. E. Byrd, U. S. N., reached the North Pole, May 9, by airplane from Spitsbergen, making first flight to pole.

Amundsen crossed the North Pole, May 12, in the airship Norge, traversing 2,700 miles in 71 hours.

Center of New Guinea, only place where white man has not yet roamed, penetrated by American-Dutch party.

An expedition to Greenland to locate the seat of the North Atlantic storms was headed by Dr. William H. Hobbs, of the University of Michigan.

General Science

Four of the most important scientific gatherings of the year were the International Congress of Plant Sciences held at Cornell University, Ithaca, N. Y.; the International Congress of Physiologists held at Stockholm; the First International Congress on Sexual Research at Berlin, and the Pan-Pacific Science Conference at Tokyo.

Gemany was admitted to the International Research Council.

The first volume of the International Critical Tables comprising an invaluable collection of statistical information for the use of scientists generally, was issued by the National Research Council.

An institution for popularizing science, L'Office d'Information Scientifique et Technique, similar to Science Service, opened in Paris under the patronage of the Duc de Gramont.

Geology and Geography

Thick vast beds of potash in Texas and New Mexico were discovered and promise to free America from German potash monopoly.

A gold ore deposit of importance was discovered at Boliden, near the Arctic Circle, by Swedish engineers, using electrical prospecting methods.

Prehistoric reptile footprints in sandstone, 25,000,000 years old, were brought to U. S. National Museum by their discoverer, Charles W. Gilmore.

A 400 million year old fossil fish, found in Norway, was presented to Princeton University.

While the U. S. S. *Maryland* made a trip to Australia, a chart of the sea bottom along the route was made by the automatic depth sounder, which kept a continuous record throughout the long voyage.

Iceberg predictions were undertaken by the International Ice Patrol.

Medicine

Partial immunization to measles, by means of injections of blood serum from persons who have had the disease and recovered, was claimed in a report to the League of Nations Health Committee.

The germ of oroya fever, or Peruvian fever, was isolated at the Rockefeller Institute by Drs. Hideyo Noguchi and T. S. Battistini.

Dr. E. B. Krumbhaar of Philadelphia announced that the spleen is an important source of the anti-bodies in the blood, which aid the body in resisting bacterial infection.

A skin test for susceptibility to infantile paralysis was originated by Dr. Edward C. Rosenow of the Mayo Foundation.

Bacteriophage, the enemy of germs, discovered by Dr. F. d'Herelle, was declared by him to be a living parasite of parasites and not just a chemical factor.

Cause of creeping eruption was found to be a small parasitic thread worm by experts at U. S. Bureau of Etomology.

Mrs. Margaret R. Lewis, of the Carnegie Institution, and Howard B. Andervont, Johns Hopkins University graduate student, discovered that a form of cancer occuring in chickens is the result of the white blood cells running wild.

Experiments on 50,000 mice by Dr. Maud Slye, of the Universtiy of Chicago, showed that resistance as well as susceptibility to cancer in mice is hereditary.

Virus from chicken sarcoma was found to be absolutely resistant to X-rays by workers at Cancer Research Laboratory at Middlesex, England.

Rat bite fever was found to be an effective cure for general paralysis or paresis.

The Pasteur Institute claimed that babies may be protected from tetanus infection by giving prenatal doses of tetanus anatoxin to mothers.

Indications were found that trachoma, a disease of the eye for which immigrants have been barred from entering the U. S., is due to a deficient diet, by Dr. B. Franklin Royer, medical director of the national committee for the prevention of blindness.

Two Prague scientists discovered a way of using washed animal blood in human transfusions.

By coating them with gold, Prof. H. Bechold, German scientist, made visible minute bacteria formerly beyond the power of any microscope.

Polonium, the radioactive element isolated by Mme. Curie, was declared to be of possible use in treating syphilis as a result of preliminary tests made at the Pasteur Institute.

The theory that some diseases may be the result of a partnership of two kinds of germs was advanced by Dr. Aldo Castellani, internationally known for his studies of tropical diseases.

Protection against typhoid fever by swallowing vaccine was tried out experimentally in bacteriological laboratories at the State College of Washington.

Discovery of the chemical compound in tuberculin that causes the skin reaction in persons that have tuberculosis was announced by Dr. Florence B. Seibert, of the University of Chicago, as a new step toward understanding the chemistry of tuberculosis.

The belief that the adrenal glands play an important part in the production of body heat was advanced by Dr. Charles Sajous, professor of endocrinology at the University of Pennsylvania.

It was shown that ultra-violet light is necessary for the formation of vitamin B, which prevents beri-beri and similar diseases, and of the growth-promoting vitamin A, at least to a certain extent.

Nickel and cobalt were shown to be necessary to the proper functioning of the pancreas, which prevents diabetes, by Gabriel Bertrand, of the Pasteur Institute of Paris.

The Health Organization of the League of Nations built up an epidemiological service to check the spread of infectious diseases between countries.

A drive for full birth and death registration throughout the United States was inaugurated by the American Medical Association.

Tetraethyl lead "anti-knock" gasoline was declared by the U. S. Public Health Service to be not unduly dangerous to health when made under specified and carefully supervized conditions.

A movement to secure uniform milk ordinances for all the states was instigated by the U. S. Public Health Service at a conference of health authorities from the different states.

Berlin established a matrimonial bureau where candidates for marriage can receiv medical and genetical advice.

The first meeting of the American Health Congress was held at Atlantic City.

Physics

Dr. W. D. Coolidge, of the General Electric Company, demonstrated a new cathode ray tube, with which these rays are for the first time obtained in quantity outside the tube. The effect of the tube

(Just Turn the Page)

Scientific Events

(*Continued from page 25*)

is estimated to be equivalent to a ton of radium.

Prof. A. A. Michelson of the University of Chicago announced his new determination of the speed of light as 299,786 km. or 186,284 miles per second.

Helium was prepared in solid form at a temperature of 457 degrees below zero Fahrenheit by Prof. W. H. Keeson of the University of Leyden, Holland.

Magnetism of hydrogen atom was measured by Drs. J. B. Taylor and T. E. Phipps of the University of Illinois.

The penetrating cosmic rays vary daily with the aspect of the heavens, Dr. Werner Kolhoerster, German physicist, found.

Experiments made by means of midnight balloon ascensions in Belgium showed no ether drift, thus substantiating the Einstein relativity theory.

Dr. Roy J. Kennedy of the California Institute of Technology repeated the Michelson-Morley experiment and obtained no evidence of ether drift.

Experiments by Dr. Carl T. Chase of the Norman Bridge Laboratory of Physics at Pasadena gave strong support to the Einstein theory of relativity, quite in opposition to Dr. Dayton C. Miller's results antagonistic to the famous theory.

Experiments by Dr. Rudolph Tomaschek, of the University of Heidelberg, Germany, fail to confirm the ether drift said to have been indicated by experiments of Dr. Dayton C. Miller at Mt. Wilson, California.

Dr. G. M. B. Dobson and Prof. F. A. Lindemann, of Oxford University, showed that the temperature 50 miles above the earth is as high as that of a warm summer day.

A vacuum switch which stops immense electrical currents safely was devised in the new high-tension laboratory of the California Institute of Technology.

A new kind of vacuum tube with which electric currents can be amplified two million times was developed by Dr. Albert W. Hull and H. N. Williams working in the research laboratory of the General Electric Company.

The sound of a single atom of radium was made audible to radio broadcast listeners when Dr. H. P. Cady, chemist of the University of Kansas, amplified minute electric currents 700 billion times.

The proposition that beats of a master pendulum of great precision might be signalled throughout the world by radio, so that all telegraphic, astronomical, and radio instruments would be in exact tune with each other was urged by Albert Einstein before the League of Nations Committee on Intellectual Cooperation.

Dr. James Franck of the University of Goettingen and Dr. Gustav Hertz of the University of Halle divided the 1925 Nobel physics prize, and Prof. Jean Baptiste Perrin of the Sorbonne, Paris, was awarded the 1926 Nobel prize for physics.

Prof. Niels Bohr, physicist, received Franklin medal from Franklin Institute for his work on the structure of the atom.

Dr. W. D. Coolidge, inventor of the type of X-ray tube now almost universally used in hospitals and laboratories, was awarded the Howard N. Potts Medal of the Franklin Institute for his invention which "has simplified and revolutionized the production of X-rays."

Psychology

Intelligence tests given to 301 geniuses of history by Dr. Catherine M. Cox of Stanford University showed that genius is generally revealed in youth.

Intelligence tests given to 5,500 New England school children of foreign parents were found by Dr. Nathaniel Hirsch to show that there is no connection between high intelligence and any one particular racial type.

Tests made with 100 young children showed that a two year old child that can scarcely talk is already developed into a personality type, with characteristic emotional reactions, it was reported by Dr Leslie Marston, of the Iowa Child Welfare Research Station.

The mind of a person is organized and important mental attitudes determined before birth, Dr. Stewart Paton of Princeton University declared.

First mental tests of a gorilla, made by Dr. Robert M. Yerkes, of Yale University, showed it to be the most intelligent of the higher apes.

The Yale Psycho-Clinic started on a program of studying the mental development of normal children, in which the mental growth of individual children is to be followed for a number of years, through pre-school ages and later childhood.

A close systematic study of the development of six normal children in a normal home environment was started by three scientists in New York City.

Children whose characters become warped so that they steal and commit sex offenses as a result of sleeping sickness may be reeducated by training in good habits, according to results obtained by Helvi Haahti, Finnish psychiatrist at the Institute of Juvenile Research of Illinois.

Colored moving pictures now being developed cause much less strain on the eyes than black and white pictures, according to experiments made by Dr. Leonard Troland, psychologist, of Harvard University.

Radio

Two-way radio communication was established for considerable lengths of time between New York and London.

Directed "beam" radio transmission was begun on a large scale by several stations in the British Empire.

Radio broadcasting in the United States has been under poor control due to failure of Congress to enact legislation.

New 80,000 watt radio transmitter was installed by U. S. Navy at Chollas Heights, near San Diego.

Practical television was claimed by several inventors in France and the United States.

Seismology and Volcanology

Ten severe earthquakes in or near North America were reported by seismological stations cooperating with Science Service, the U. S. Coast and Geological Survey and the Jesuit Seismological Association.

Plans were completed by the Seismological Society of America, in cooperation with the Carnegie Institution of Washington, for the establishment of a chain of seismograph stations around San Francisco Bay, to detect microscopic earth tremors and so to more adequately warn of future quakes.

Earthquake on west coast of Sumatra cost 400 lives.

Earthquakes devastated portions of Armenia.

Volcanic eruption in Tokachi, Japan, cost 900 lives.

Three hitherto unknown volcanoes were discovered in Alaska by R. H. Sargent, of the U. S. Geological Survey. The largest is six and a quarter miles in diameter.

An Eastern Section of the Seismological Society of America was established for the particular study of earthquake phenomena in the eastern part of the United States.

Switzerland has developed 70 per cent. of its available water power.

Cortez, in the sixteenth century, tried to introduce silkworm culture into Mexico.

Since the Bronze Age of prehistoric man, salt has been mined almost continuously in Austria.

Almost three-fourths of the murderers in this country have had no previous criminal record.

Habitual bad posture may cause backache, fatigue, abdominal pain, constipation, and insomnia.

An egg laying contest in Great Britain has attracted over 15,000 ambitious pullets and ducks.

The sun would appear blue-hot if it were not for the scattering of its rays by atmospheric gases.

BOTANY

Gas Attacks Hasten Ripening

The ripening of fruits can be speeded up, and sleepy seeds aroused and made to sprout without loss of time, by subjecting them to gas attacks with two of the ingredients of common city gas, ethylene and propylene, according to Prof. R. B. Harvey of the University of Minnesota.

Bananas and honey-dew melons are among the fruits especially benefited by the gas treatment. Measurements of the respiration rate of the bananas under ethylene showed that they breathed four times as fast as they do normally, indicating a general speeding up of life processes.

Other experiments indicated that special properties of some friuts might be improved by gassing. Pineapple juice, for instance, has long been known as an aid to the digestion of proteins, which include such foods as meat and cheese. The juice of pineapples ripened by the ethylene treatment digested casein, the essential protein of cheese, about one and a quarter times as fast as did the juice of untreated pineapples at the same temperature. At the same time it was found that the treated pines developed a higher sugar content.

Since treatment with a gas is less convenient than treatment with a liquid, efforts were made to find solvents for the two useful gaseous chemicals. In this, however, the research has not yet been successful, and trials of liquid compounds in which these gases are chemically combined have also failed, in some cases even poisoning the fruits. Commercial use of the gas ripening processes by fruit dealers, gardeners and similar trades is at present limited to ethylene, for propylene is not yet supplied in quantity by manufacturers.

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AGRICULTURE

Plenteous Potatoes

Talking of potatoes, the world's record crop is reported by R. C. and H. G . Zuckerman of Stockton, California. They planted thirteen acres, 22,000 plants to the acre, and produced 1038 bushels per acre, which was 76 bushels more than the previous record established two years before in this same locality. But the Zuckermans profess disappointment that their yield was not 1,500 bushels and they prophecy that "a few years from now two thousand bushels will be as easy as to obtain a thousand bushels this year."

Science News-Letter, January 8, 1927

HYGIENE—CHEMISTRY

Visions Longer Life

A chemist, Dr. H. P. Cady of the University of Kansas, has looked forward fifty years into the future and this is what he sees:

Longer human life due to spectacular advances in the overlapping fields of organic chemistry, physiological chemistry and medicine.

Manufacture of rubber, oil and other essential industrial materials from chemicals so as to make man partially independent of natural processes and stores of such substances.

Photosynthesis of carbohydrates, such as plants now make, from nitrogen, water and carbon dioxide.

Metallic materials having almost any desired properties.

Transmutation of one element into another with such facility that chemistry students will yawn at demonstrations.

Formation of new theory of constitution of matter to supplant present complex and conflicting theories of atomic structure.

Millions of compounds of carbon where only a few hundred thousand are now known.

Students taking advantage of prolonged life to master all the new knowledge of chemistry.

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PHYSICS

Light Produces Electricity

A piece of the mineral molybdenite, one of the chief sources of the metal molybdenum, used in steel manufacture, may replace the fragile photoelectric cell in some forms of scientific work, according to Dr. W. W. Coblentz of the U. S. Bureau of Standards. He has been studying what he calls the actinoelectric effect of molybdenite, the property that causes it to convert light energy falling on it into electrical energy. Previously he found that pieces of the mineral have closely adjacent spots which generate either positive or negative electricity. The result is that when the whole crystal is exposed to light the positive and negative currents neutralize each other, and very little effect is noted.

Very recently, however, Dr. Coblentz has found crystals in which all of the sensitive spots give the same kind of electricity, either positive or negative. By using vacuum tube amplifiers, the current may be magnified greatly and the crystal made available as a delicate detector of light.

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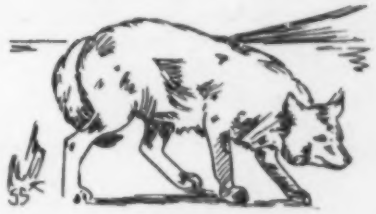
BIOLOGY

NATURE RAMBLINGS

By Frank Thone



Ishmael

Bitterly against the cold, sending a shiver to your very marrow, sounds the howl of the coyote. He is the very voice of the empty plains, of the stony barren foothills of the western mountains. He is the Ishmael among animals; none befriends him, and he is no one's friend. He is not a bold robber like his cousin the wolf, for his meager strength is sufficient only to drag down the young and weak or the old and decrepit. He is therefore contemptuously tolerated: not for him the high compliment of being relentlessly followed by highly skilled government hunters for weeks, which is paid to a "bad Lobo." Traps and poisoned meat, and casual long-range shots from the saddle when he shows himself by day, are all the gates of death that man bothers to open for the poor coyote.

He is, to be sure, sufficiently destructive to lambs and calves to draw the lightning upon his head in the form of offered bounties by the states for his scalp; and in game refuges, such as the antelopes' valley in Yellowstone Park, rangers beset his path with trap lines. During the past year 243 coyotes thus paid with their lives for their presumption in trespassing the pronghorns' pasture, and their pelts piled high in the rangers' cabins.

Yet even so despised a creature as the coyote has his uses. His nose is not so nice that he is above joining the buzzard and the crow at their feasts, and he thus serves as scavenger. Moreover, he is humbly content with mice, ground-squirrels, grophers and "such small deer" as his principal summer diet, so that he also functions as a sort of living vermin-trap.

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Pop bottles left by tourists have caused forest fires in the west.

Oaks are, generally speaking, the most useful of all trees for roadside planting.

Teak wood is valued in shipbuilding because it withstands attacks of marine borers.

How to Use Index Feature of News-Letter

In order to aid in catching the items that concern you and to facilitate clipping and filing, a key word in small capitals has been printed on the right of the line above each article. The key words used fit into any system of classification, whether it be a straight alphabetical file, a system of your own devising, the Library of Congress classification or the Dewey system.

Note that you can clip out any article without fear of damaging another article in which you might be interested, since editorial matter printed on the righthand pages is backed by advertising, standing matter or a continuation of the article on the other side.

Library of Congress Classification

The classification of the Library of Congress has come into common use in the libraries of the country owing to the publication of the Government of the card index of all new books. We print below a list of the subject titles which are most used in the SCIENCE NEWS-LETTER. The full scheme of classification is contained in "Outline Scheme of Classes," issued by the Library of Congress.

B Philosophy.
BF Psychology.
G Geography, voyages, travel.
GA Mathematical and astronomical geography.
GB Physical geography.
GC Oceanology and oceanography.
GF Anthropogeography.
GN Anthropology. Somatology. Ethnology. Ethnography. Prehistoric archæology.
GR Folklore.
GT Manners and customs.
GV Sports and amusements. Games.
HC Economic history and conditions. National production.
HE Transportation and communication.
HF Commerce.
HM Sociology. General.
L Education.
M Music.
N Fine Arts.
P Philology and linguistics.
Q Science. General.
QA Mathematics.
QB Astronomy.
QC Physics.
QD Chemistry.
QE Geology.
QH Natural history.
QK Botany.
QL Zoology.
QM Human anatomy.
QP Physiology.
QR Bacteriology.
R Medicine. General.
S Agriculture. General.
SB Field crops. Horticulture. Landscape gardening. Pests and plant diseases.
SD Forestry.
SF Animal culture. Veterinary medicine.
SH Fish culture and fisheries.
SK Hunting. Game protection.
T Technology. General.
TA Engineering—General.
TC Hydraulic engineering.
TD Sanitary and municipal engineering.
TE Roads and pavements.
TF Railroads.
TG Bridges and roofs.
TH Building construction.
TJ Mechanical engineering.
TK Electrical engineering and industries.
TL Motor vehicles. Cycles. Aeronautics.
TN Mineral industries. Mining and Metallurgy.
TP Chemical technology.
TR Photography.
TS Manufactures.
TT Trade.
TX Domestic science.
U Military science. General.
V Naval science. General.

Dewey Classification

The main divisions of the Dewey Decimal Classification, used in many libraries and by many individuals, is given below for the convenience of those who wish to use this system:

000 GENERAL WORKS—
010 Bibliography
020 Library economy
030 General cyclopedias
040 General collected essays
050 General periodicals
060 General societies
070 Newspapers
080 Special libraries. Polygraphy
090 Book rarities
100 PHILOSOPHY—
110 Metaphysics
120 Special metaphysical topics
130 Mind and body
140 Philosophical systems
150 Mental faculties. Psychology
160 Logic
170 Ethics
180 Ancient philosophers
190 Modern philosophers
200 RELIGION—
210 Natural theology
220 Bible
230 Doctrinal. Dogmatics. Theology
240 Devotional. Practical
250 Homiletic. Pastoral. Parochial
260 Church. Institutions. Work
270 Religious history
280 Christian churches and sects
290 Ethnic. Non-Christian
300 SOCIOLOGY—
310 Statistics
320 Political science
330 Political economy
340 Law
350 Administration
360 Associations. Institutions
370 Education
380 Commerce. Communication
390 Customs. Costumes. Folklore
400 PHILOLOGY—
410 Comparative
420 English
430 German
440 French
450 Italian
460 Spanish
470 Latin
480 Greek
490 Minor languages
500 NATURAL SCIENCE—
510 Mathematics
520 Astronomy
530 Physics
540 Chemistry
550 Geology
560 Paleontology
570 Biology
580 Botany
590 Zoology
600 USEFUL ARTS
610 Medicine
620 Engineering
630 Agriculture
640 Domestic economy
650 Communication. Commerce
660 Chemical technology
670 Manufactures
680 Mechanic trades
690 Building
700 FINE ARTS—
710 Landscape gardening
720 Architecture
730 Sculpture
740 Drawing. Decoration. Design
750 Painting
760 Engraving
770 Photography
780 Music
790 Amusements
800 LITERATURE—
810 American
820 English
830 German
840 French
850 Italian
860 Spanish
870 Latin
880 Greek
890 Minor languages
900 HISTORY—
910 Geography and travels
920 Biography
930 Ancient history
Modern
940 Europe
950 Asia
960 Africa
970 North America
980 South America
990 Oceanica and polar regions

First Glances at New Books

THE RACIAL BASIS OF CIVILIZATION—Frank H. Hankins—*Knopf.* This is a smash at the great Nordic myth that has grown up in recent years, and includes an extensive and interesting analysis of what is a race.

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ANNUAL REPORT OF THE SMITHSONIAN INSTITUTION, 1925—*Government Printing Office.* ($1.50) Of most general interest is the 600-page appendix, where are reprinted important articles on physics, astronomy, botany, zoology, biography, etc.

Science News-Letter, January 8, 1927

THE AMERICAN ANNUAL OF PHOTOGRAPHY, 1927—*American Photographic Publishing Co.* ($1.50). The latest edition of the photographer's *vade mecum* in a new and enlarged form. A very complete section on new scientific developments in photography is of special interest.

Science News-Letter, January 8, 1927

THE PATHFINDER STAR MAPS—Edward S. King—*Cosmos Press.* ($1.25). Twelve star maps, for each month of the year, conveniently printed on one side of semi-translucent paper so that a flashlight can be used back of them at night.

Science News-Letter, January 8, 1927

THE DENTITION OF DRYOPITHECUS AND THE ORIGIN OF MAN—W. K. Gregory and Milo Hellman—*New York: American Museum of Natural History.* Out of the mouths of apes more ancient than the hills of India, evidence on the most agitated and most crucial question in evolution.

Science News-Letter, January 8, 1927

THE HYDROSTATIC SYSTEM OF TREES—D. T. MacDougal—*Carnegie Institution of Washington Publication No.* 373. New light on that most puzzling hydrostatic paradox: how water flows uphill in the trunks of trees. Prof. MacDougal's experiments are simple and clear, and his results authentic.

Science News-Letter, January 8, 1927

FOGS AND CLOUDS—William J. Humphreys—*Williams and Wilkins* ($4.) Humphreys has made the collection of pictures of fogs and clouds his hobby and now has arranged and explained them. All who have occasion to watch the sky will enjoy the hundred photographs and accompanying text.

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MOTOR VEHICLES

Mathematician as Motorist

Quotation from COMMON SENSE AND ITS CULTIVATION. Dr. Hanbury Hankin. Dutton.

Mr. A. E. Morgan, the Principal of the Antioch College, Ohio, has related to me that, on one occasion in a lecture he illustrated a point by saying that a person driving a motor would probably fail to get through a crowded street crossing if he depended on formal logical processes. Instead of doing this he relies on complicated estimates of the speeds of other cars carried out subconsciously far more rapidly than could be done in consciousness. After the lecture a member of the audience came to him and told him he had in his employ a mathematician who, in his subject, was of exceptional ability. But the bent of his mind was so strong towards formal logical processes that he had to give up driving his motor. On reaching a crossing he would have to stop and calculate the probability of collisions with other motors. Even his rare mathematical ability was insufficient for such an occasion and he got into so much trouble in driving that he gave up the practice entirely.

This incident illustrates the fact that, if we have to come to a decision, more than one kind of mental process is available.

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PHYSIOLOGY

Pale Leaves: Few Vitamins

If Junior balks at eating dark-colored greens and insists on nice, white hearts of lettuce, tell him gently but firmly that if he wants to grow up big and tall like Papa he'd better take the green and leave the white. Preliminary reports by Dr. John W. Crist and associates, on growth experiments performed at Michigan State College, indicate that Vitamin A, indispensable for proper growth in young animals and young children alike, is associated with the greenness of the vegetables in their diet.

"Albino rats have been fed on leaf and head lettuce, which naturally differ greatly in degree of greenness, as sources of vitamin A," says Dr. Crist. "Without exception, the greener material has been superior in the production of growth. Equivalent amounts of it have not only been antecedent to greater gains in weight but also to more consistently uniform gains."

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Government experts have designed a device to measure the light given off by an electric light bulb.

EDUCATION

Gifted Children a Problem

The recent idea of putting gifted children together into special classes so that they are not held back by the slow and the stupid does not solve the important problem of how to educate superior children. This is the conclusion from an experiment described by Dr. M. J. Van Wagenen, of the University of Minnesota.

In Dr. Van Wagenen's experiment the work done by mentally superior children taught together in a special eighth grade class was compared with the work done by superior children who attended eighth grade classes with the rank and file of boys and girl. The boys and girls of the special group did better work in fundamentals of arithmetic than the gifted children in the mixed classes. But when it came to arithmetic problems, the special gifted class fell below the others, and so on down the list of school subjects, with the gifted group doing a little better in one subject and not so well in another.

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RADIO

Crystals Regulate Radio

Quartz crystals, now extensively used in controlling the wave length of radio broadcasting stations to keep the length constant, may now be available for long wave commercial stations, as a result of experiments by J. R. Harrison, assistant in physics at Wesleyan University, Middletown, Conn. Formerly, for long waves it was necessary to use large crystals so that they would vibrate with the proper frequency, but Mr. Harrison has found a type of mounting in which the electrical field is applied in a way that causes the crystals to vibrate more slowly than it ordinarily does.

Science News-Letter, January 8, 1927

HEREDITY

Page Mendel

We do not clearly comprehend the workings of heredity,
Which causes traits to cling to us like odor of asafœtida—
That is, the ones we fain would shake, like baldness and obesity,
While those we like, we cannot have; now is this a necessity?

* * * * * *

(We give it up. Lord help us all!)

—*Anonymous.*

Science News-Letter, January 8, 1927

Only about one person in 18 is suceptible to ivy poisoning.

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Anniversaries of Science

January 11, 1911.—Kaiser William II's Society for the Promotion of Scientific Research opened in Berlin.

January 11, 1672.—Isaac Newton was elected a fellow of the Royal Society.

I wish we could derive the rest of the phenomena of nature . . . from mechanical principles; for I am induced by many reasons to suspect that they may all depend upon certain forces by which the particles of bodies, by some causes hitherto unknown, are either mutually impelled towards each other, and cohere in regular figures, or are repelled and recede from each other; which forces being unknown, philosophers have hitherto attempted the search of nature in vain; but I hope the principles here laid down will afford some light either to that or some truer method of philosophy.

—Isaac Newton: preface to the *Principia*.

January 11, 1787.—Oberon and Titania, two satelites of the newly discovered planet Uranus, were discovered by Herschel.

And deeper yet,—twelve million leagues of twilight
Divide mine empire even from Saturn's ken.
Is there a world whose light is not as my light,
A midget world of light-imprisoned men?

Shut from this inner vision that hath found me,
They hunt bright shadows, painted to betray;
And know not that, because their night hath drowned me,
My giants walk with gods in boundless day.

—Noyes: *Uranus* in *Watchers of the Sky*.

January 12, 1665.—Death of Pierre de Fermat, mathematician.

Pierre de Fermat was a man of quite exceptional position in mathematical history. Devoting to mathematics such leisure as his public duties afforded, he nevertheless published almost nothing, many of his results being known to us only in the form of brief marginal notes without proof. In editing Diophantus he enunciated numerous theorems on integers, for example,

An odd prime can be expressed as the difference of two square integers in one and only one way.

No integral values of x, y, z can be found to satisfy the equation $x^n + y^n = z^n$, if n be an integer greater than 2.

This seemingly simple theorem has been verified for so wide a range of values of n, that its truth can hardly be doubted, but no general proof has yet been given in spite of a prize of 100,000 marks awaiting him who either proves or disproves it.

—Sedwick and Tyler: *A Short History of Science*.

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New Stone Age lake dwellers of Switzerland knew how to weave cloth and make embroidery.

ASTRONOMY

Sunspots on Increase

People who failed to get sufficiently sunburned last summer may have hopes for next summer, because the activity of the sun, as measured by the sun spot cycle, is still increasing and will probably continue to do so until the end of 1927 or the beginning of 1928, according to Miss Hazel M. Losh of the Mt. Wilson Observatory, California, who reports researches made jointly with Dr. Seth B. Nicholson.

Sun spots were at a minimum in 1923 and since then they have been increasing in number. During the last few months the solar activity has been about as great as in 1917, when the last maximum occurred. But there is this difference. In 1917 the spots were near the equator of the sun, as they always are when the cycle has reached its height. This fall the spots, though numerous, have been nearer the poles of the sun than in 1917, and so this indicates, it was said, that the maximum has not yet been reached. If the maximum comes about a year from now the sun spot period will be only about ten years long, a year shorter than the normal period.

Such a variation in sun spot cycle may have occurred in the past, according to Dr. A. E. Douglass, of the University of Arizona. His researches show a relation between three rings and sun activity. From 1748 to 1788, for example, Professor Douglass's studies of the trees show, there were four cycles of ten years each, while in the following 42 years there were only three cycles of 14 years each.

Dr. Douglass's Studies are based on the fact that the tree rings, which represent growth of a tree during the year, vary in thickness with the amount of moisture that they receive during the growing season, and that rainfall varies with the sun spots. So by studying old trees, such as the giant Sequoias, in California, and other old trees in Arizona, the past activity of the sun may be traced.

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PHYSIOLOGY

Purifying Sex Hormone

Working with apparatus under pressure of five atmospheres two scientists at the University of Denver are endeavoring to isolate the female sex hormone and obtain it free from harmful impurities.

Dr. R. G. Gustavson and Hugo Krueger, reported to the American Association for the Advancement of Science that they had succeeded in dissolving the valuable substance in liquid ammonia. Since ammonia can only be liquefied at a point far below the freezing point of water, the experimental difficulties the workers have had to overcome are obvious. Their achievement is important because it separates the hormone from cholesterol, one of its common impurities, which is not soluble in ammonia.

It is believed that the administration of the female sex hormone will be of great benefit if it can be obtained in a state free from the impurities that might cause harm when injected into the human system. In consequence its isolation in a chemically pure state has been the goal of many chemists and physiologists.

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ARCHÆOLOGY

Cave Man Treasured Fossil

Who was the first paleontologist, the first collector of those records of life in the rocks from which science has built up the history of the earth? Barnum Brown of the American Museum of Natural History, New York, recently reported the discovery of a 5,000,000-year-old elephant's tooth found in Grecian ruins that were once frequented by Hippocrates, the father of Medicine. He asked then: "Is this the earliest known fossil collected by man?"

Now Dr. George Grant MacCurdy of Peabody Museum of Natural History, Yale, points out that what is probably the first fossil to have been collected by man is a trilobite found by archæologists when digging out the floor deposits of a cave near Arcy-sur-Cure in the department of Yonne, France.

"This cave was first inhabited by Neanderthal man," Dr. MacCurdy explained, "then there came in turn the Aurignacians, Solutreans, and Magdalenians generally referred to as the Cro-Magnon races. It was one of the Magdalenians who found the trilobite and left it on the cave some 20,000 years ago, at least 18,000 years before some Greek left the elephant tooth at the Asklepieion. The trilobite is incised ventrally and also bears two lateral perforations—proof that it had been the property of some Magdalenian occupant of the cave. This cave has been very appropriately christened *grotte du trilobite* (cave of the trilobite)."

Trilobites are crustaceans and first appeared in great variety in the geologic age known as Cambrian some 225,000,000 years ago, they lived through a number of geologic ages and finally became extinct during the Permian Period 75,000,000 years ago.

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